

Understanding of the Sources of Hedge Fund Returns

Thomas Schneeweis
Director of Research, Ursa Capital LLC

Vassilis Karavas
Head of Risk Management, Ursa Capital LLC

Rae DuBose
Co-Head of Due Diligence, Ursa Capital LLC

Madanda Machayya
Co-Head of Due Diligence, Ursa Capital LLC

July 2005

Abstract

Considerable academic and practitioner research has reviewed both the market factors (e.g., equity and bond returns) and fund factors (e.g., fund size) affecting various hedge fund strategies. The market factors affecting hedge fund returns are based on the underlying securities held and the trading philosophy behind each strategy. In this paper, we illustrate how market factors (e.g., stock and bond index returns, market volatility) and various firm/fund attributes (e.g., fund size, leverage...) can be used to understand the sources of hedge fund returns.

Understanding of the Sources of Hedge Fund Returns

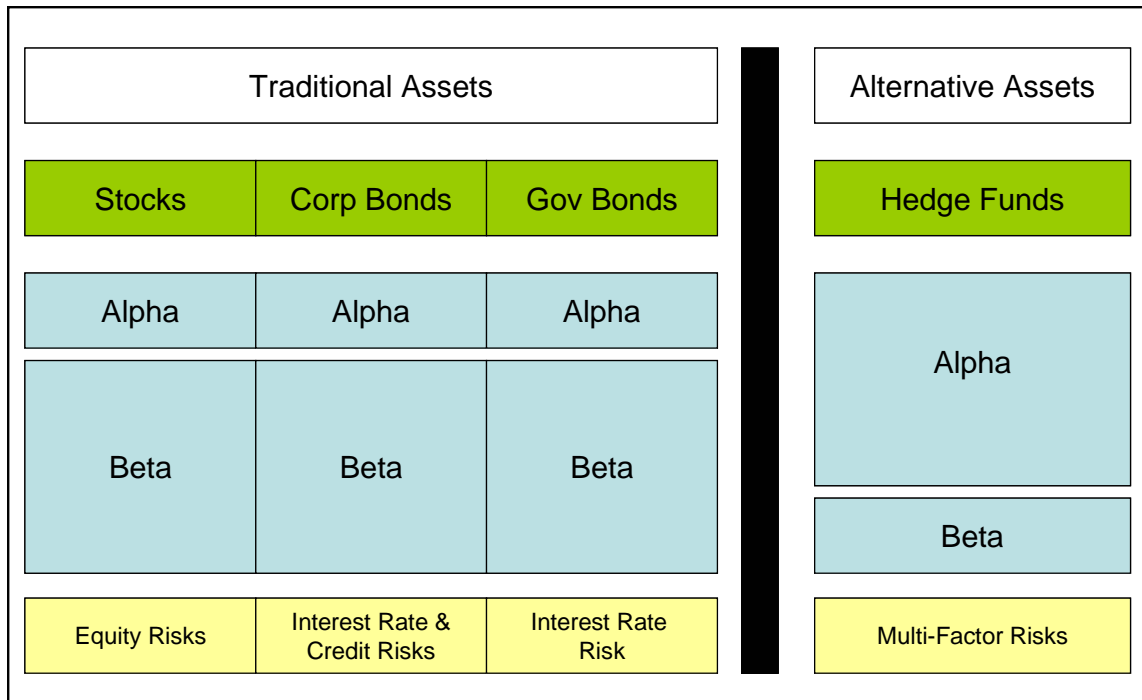
Introduction

Driven by changes in regulation, information technology and investor demand for investments that help to diversify traditional stock and bond portfolios, assets under management in the hedge fund industry have grown from under \$25 billion in 1990 to almost \$1 trillion in 2005. This growth has been due, in part, to new financial vehicles as well as changes in technology that permit sophisticated investment strategies to be designed, implemented and offered to investors without the infrastructure of a large investment firm. Hedge funds offer unique opportunities to enhance portfolio returns in economic environments in which traditional stock and bond investments offer limited opportunities and other alternative investment vehicles (e.g., commodities, real estate, and private equity) do not provide similar returns. For hedge funds, these return opportunities stem from the expanded universe of securities available for trading and the wide range of trading strategies that can be employed to trade this universe. For instance, hedge funds can access both exchange traded and over the counter markets and can easily take long, short, spread and option positions in any of these markets.

Given the diversity of trading markets and trading strategies, hedge fund returns may not be directly linked to traditional stock and bond benchmarks. Since their trading strategies may offer positive returns across a wide variety of market conditions and are not managed simply to achieve outperformance relative to an existing 'long only' stock or bond index, hedge funds have also been described as absolute return strategies. While hedge funds are actively managed, such that individual trader skill is an important element in total return, active management and a lack of direct index tracking does not mean that a particular hedge fund strategy does not have well

known sensitivities to various market or fund/firm factors. For example, traditional stock and bond investments are also actively traded and are also exposed to changes in market factors such as interest rates and credit risks. Similarly, research (Schneeweis et. al., 2002, 2003) shows that various hedge fund strategy returns are also driven by market factors such as changes in interest rates, credit spreads, and market volatility as well as certain structural fund/firm characteristics (e.g., fund size, leverage). As shown in **Exhibit 1**, hedge funds differ from traditional assets less in the kind of risks taken than in the degree to which market factors, strategy factors and trading skill explain return movement.

Exhibit 1: Relative Importance of Alpha in Traditional Assets and Hedge Funds



Thus, similar to traditional stock and bond markets one can think of hedge fund returns as a combination of alpha (strategy return due to the unique trading attributes of the fund manager) and the underlying natural return to the strategy itself based on its natural exposure to various

market risks. Since the natural return to a hedge fund strategy is a function of the securities and relative risk exposures held, hedge funds are generally classified according to the underlying markets traded and their degree of market exposure. Hedge funds are most often grouped into one of the following strategy areas.

Equity Market Neutral: Managers identify overvalued and undervalued equity securities while neutralizing the portfolio's exposure to market risk by combining long and short positions.

Benefits: Broadly speaking, equity market neutral programs derive their profitability from the efficient use of information regarding related but distinct equities, the willingness to bear risks that other institutions are unwilling to assume, and the persistence of imperfect arbitrages. Asset portfolios are typically structured to be market, industry, sector, and dollar neutral.

Risks: Expected relationship between long and short positions may break down during periods of financial crisis. Short positions expose the managers to unique risks (short squeeze). Equity market neutral managers may accept a small degree of systematic risk (market direction risk).

Convertible Arbitrage: Managers identify corporate convertible securities that are mispriced relative to the issuers' other equity or debt securities.

Benefits: This strategy has moderate to low correlation with equity returns and high yield bond markets. Depending on the degree of hedging, the strategy may have a positive correlation with market volatility. Improved credit conditions could also help those managers who have long positions in low credit convertibles.

Risks: The strategy may be affected negatively by a) deterioration in the credit quality of the issuers, b) sharp declines in equity market volatility, and c) potential lack of liquidity intensified by the fact that hedge funds are large buyers of the existing supply of convertibles. Some hedge fund managers deliberately over-hedge when there is concern about default, as the excess short position may partially hedge against a reduction in credit quality.

Fixed Income Arbitrage: Managers invest in offsetting long and short positions in related fixed income securities and their derivatives whose values are mathematically or historically interrelated, but in which the arbitrageur believes the relationship is currently disrupted.

Benefits: The fixed income arbitrageur seeks to buy underpriced securities and simultaneously sell related securities that are overpriced. For interest rates changes in general, a position would be immunized due to its offsetting positions. Therefore, profits are realized when the skewed relationship in price moves back to the anticipated level.

Risks: As indicated by the events of August 1998, spreads can move in the opposite direction to that expected and the use of leverage increases the risk of funding.

Event Driven: Managers implement various strategies that may potentially benefit from specific events or market conditions. These strategies often take positions in companies involved in mergers, bankruptcies, as well as other corporate events and special situations.

Benefits: Event driven managers exploit price spreads of companies involved in corporate events. They may take positions in out of favor securities on account of these events, or in

securities that cannot be held by institutional investors. These events may involve restructurings or recapitalizations, spin-offs or carve-outs, and directional positions that may not be fully arbitrated. Thus, the returns to this group of hedge fund managers may be based on fundamental research as well as directional market returns.

Risks: Similar to those of merger arbitrage and distressed securities strategies such as exposure to changes in credit markets and unexpected events affecting expected corporate events.

Distressed Securities: Managers invest in both debt and equity of companies that are in or near bankruptcy.

Benefits: Many institutional investors, such as mutual funds, either prefer or are required to unload positions in troubled companies. Consequently, large blocks of distressed securities often trade very suddenly. This selling pressure distorts pricing and creates opportunities for distressed securities managers to purchase securities at levels far below their intrinsic value.

Risks: Transactions involving bankruptcies are extremely complex and risky. The bankruptcy code provides sweeping power to the bankruptcy trustee to make decisions it believes are in the best interest of the bankruptcy trust. Distressed securities investments are also very illiquid. The strategy tends to have some exposure to credit markets.

Merger Arbitrage: Managers seek to capture the price spread between current market price of corporate securities and the value upon successful completion of a takeover, merger, or spin-off.

Benefits: Most equity investors are not comfortable with analyzing and bearing the risks associated with merger arbitrage. They generally are willing to accept a small discount to fair value in order to shift those risks to arbitrage specialists who are better able to manage those risks. The uncertainty of corporate events – resulting in mispriced securities – is the primary source of returns. Managers profit by correctly anticipating or, at times, even forcing a resolution to a corporate event.

Risks: Supply of merger deals is quite cyclical and is closely related to the performance of equity markets. As such, this strategy has some exposure to equity risk. Non-economic factors (e.g. regulations affecting corporate events) are also sources of risk.

Equity Long/Short (Equity Hedge): Managers combine long positions with short sales of stock or stock index options. Portfolios may be anywhere from net long to net short, depending on the manager's view of market conditions. Theoretically, returns are unrelated to market movements and profits can be made in both rising markets and declining markets.

Benefits: Long positions are expected to outperform the market whereas short positions are expected to underperform the market. Therefore, if the long and short positions within the hedge are successful, the fund manager will have the potential for positive returns in a wide variety of market conditions.

Risks: Most equity long/short strategists use leverage to add new stock to the portfolio without selling something else first. The amount of leverage used determines how aggressive the

manager is in exploiting investment opportunities but also exposes the manager to increased risks. Equity long/short managers accept varying degrees of systematic risk (market direction risk).

Global Macro: Managers seek trends in stock markets, interest rates, foreign exchange rates, and commodities to make leveraged bets on the price movements anticipated in these markets.

Benefit: The investment policy is flexible and managers make leveraged bets across multiple markets, sectors, instruments and trading styles as macro conditions so dictate. Investments are based on forecasts of changes in interest rates, currency markets, equity markets and global political and economic policy.

Risks: Given the directional view of much of a manager's trading, market risks as well as exposure to systemic market risks exist.

Empirical Analysis

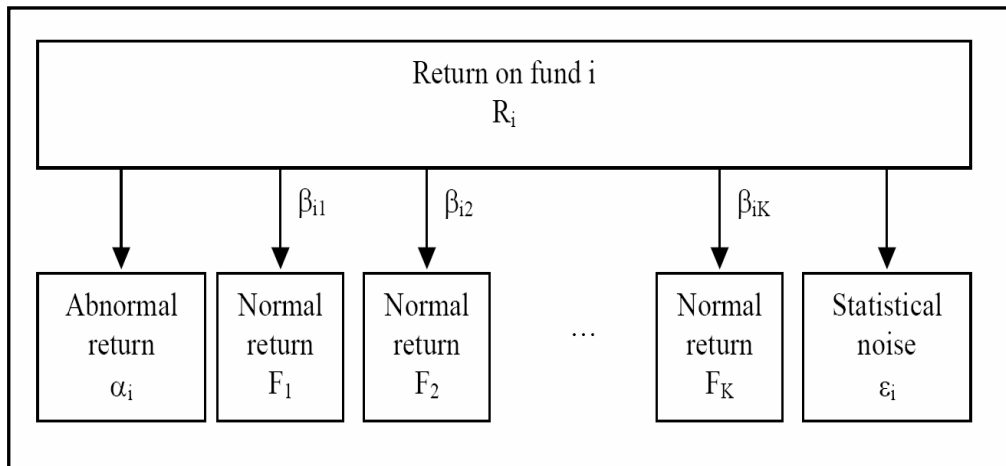
As discussed previously, hedge funds have been described as skill-based investment strategies. Skill-based strategies obtain returns from the unique skill or strategy of the trader. Because hedge funds are actively managed, manager skill is certainly important. However, academic research [Schneeweis et. al., 2003, Fung and Hsieh, 2002] demonstrates that hedge fund returns are also driven systematically by market factors such as changes in credit spreads or market volatility, rather than exclusively by individual manager's alpha. In brief, one can think of hedge fund returns as a combination of manager skill and an underlying return to the hedge fund strategy or investment style itself. Moreover, one can measure the sensitivity of hedge fund

strategies to traditional market factors using a traditional multi-factor model as shown in **Exhibit 2**.

Exhibit 2: Multi-Factor Regression Format

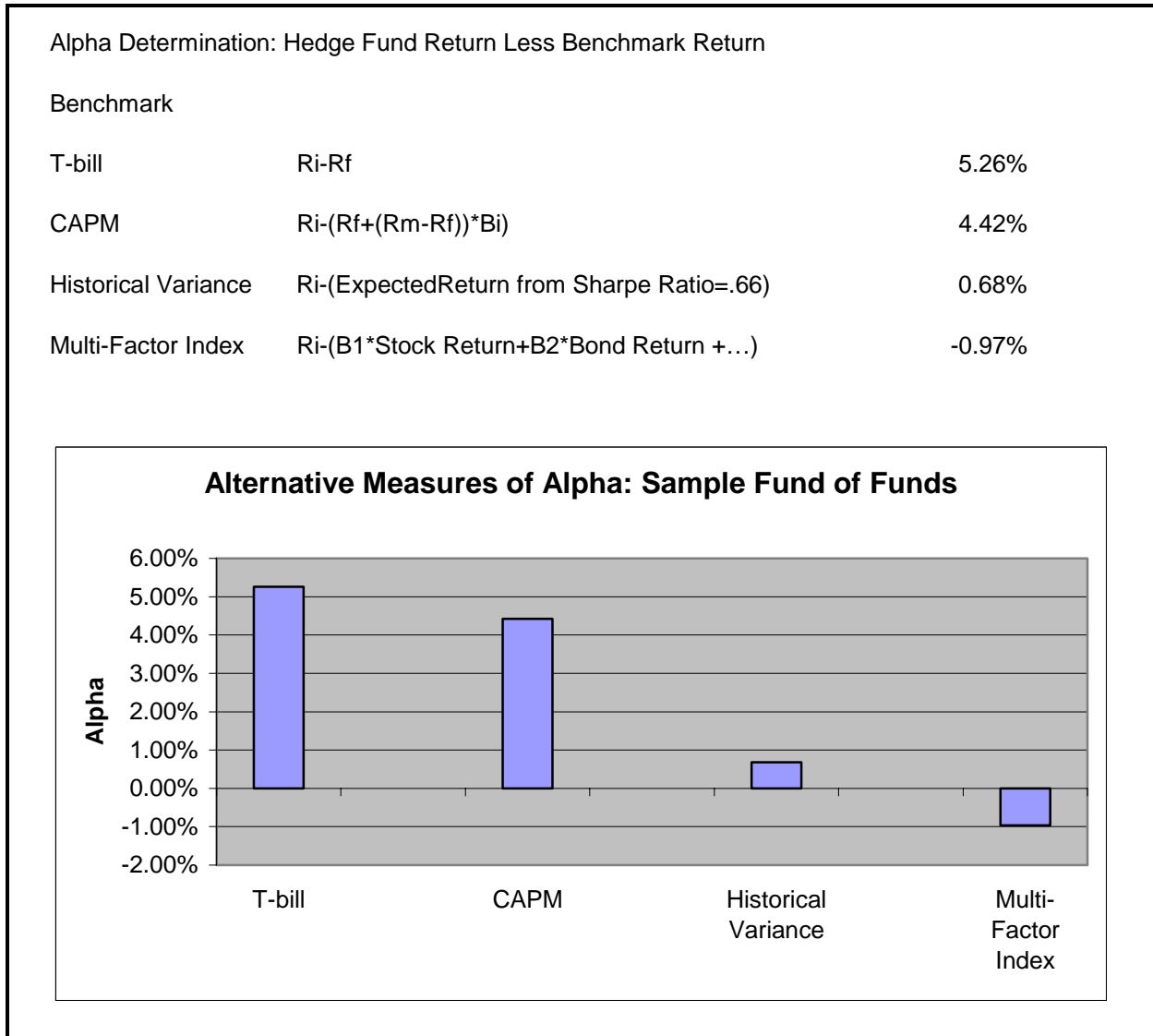
$$R_i = \alpha_i + \beta_{i,1} F_1 + \dots + \beta_{i,N} F_N + e_i$$

F_i represents the return on market factor I



The importance of using a multi-factor model in return estimation is illustrated in **Exhibit 3**. While many hedge funds continue to compare their returns with Treasury bill returns, the S&P 500, or even returns based on an expected Sharpe ratio, the actual excess return of a hedge fund, after considering a wider range of comparison risk assets or market factors, is often close to zero. This is not to say that hedge funds do not provide value, only that the returns to hedge funds are commensurate with the underlying risks to which they are exposed.

Exhibit 3: Alpha Determination Based on Single Factor and Multi-Factor Benchmarks



The value of comparing hedge fund returns across a variety of market factors is also shown in **Exhibit 4**, which provides an example of a series of multi-factor regressions for a wide range of hedge fund strategies. The similar sensitivity of certain hedge fund strategies to stock and bond markets reflects their common sensitivities to common market factors. As shown in **Exhibit 4**, equity based hedge fund strategies (e.g., equity long/short, merger arbitrage) often have exposure

to the same market factors (e.g., equity market returns, equity market volatility). Credit sensitive hedge fund strategies (e.g. convertible arbitrage, distressed securities) also often have similar exposure to the same factors (high yield debt). In brief, the similarities in the sensitivities of various hedge fund strategies to specific market return factors reflect similarities in risk exposure.

Exhibit 4: Multi-Factor Regression

	Multiple Regression (1998-4/2005)					
	Beta Coefficients					R-Square
	Alpha	Lehman				
S&P 500		Gov't Bond	Lehman HY Corp	Change in Vix		
Equity Market Neutral Index Composite	0.46%	0.02	0.12	-0.02	-0.02	0.08
Convertible Arbitrage Index Composite	0.53%	0.02	-0.02	0.27	0.01	0.23
Fixed Income Arb Index Composite	0.45%	0.01	0.00	0.16	-0.13	0.41
Event Driven Index Composite	0.77%	0.03	-0.19	0.40	-0.13	0.52
Distressed Securities Index Composite	0.75%	0.05	-0.11	0.39	-0.13	0.54
Merger Arbitrage Index Composite	0.45%	0.01	0.00	0.16	-0.13	0.41
Equity Long/Short Index Composite	0.69%	0.10	0.02	0.29	-0.23	0.24
Global Macro Index Composite	0.41%	0.08	0.15	0.28	-0.05	0.17

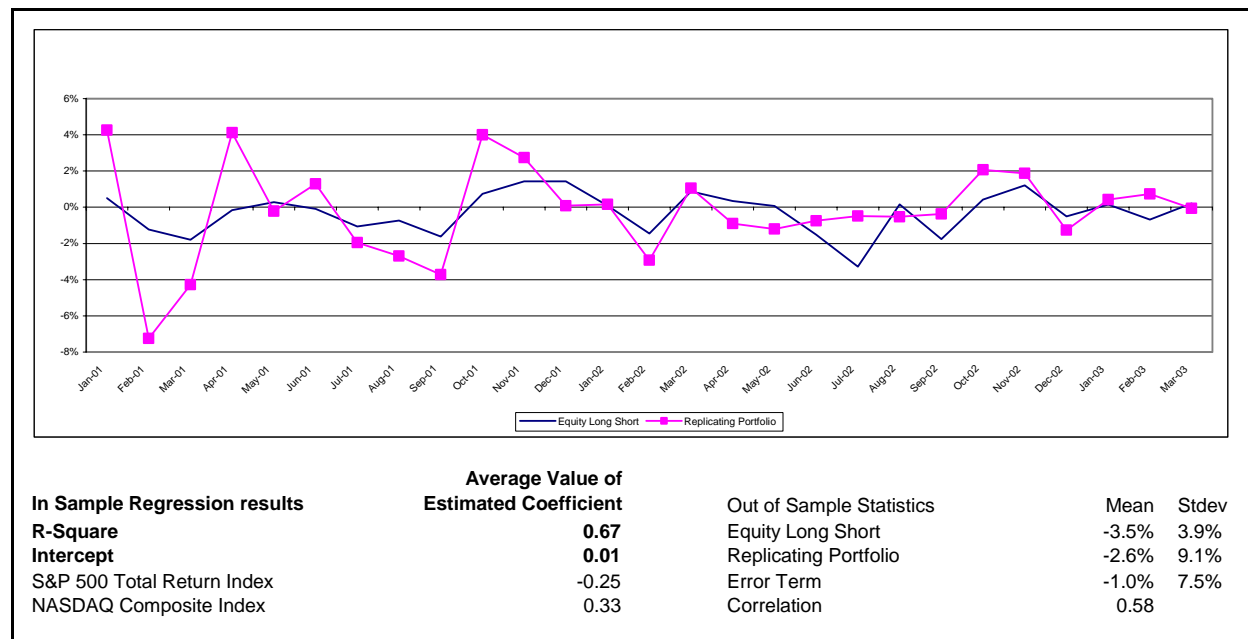
This regression was run using monthly data.
Composite Indices are the average of three hedge fund performance indices (EACM, HFR, CSFB)

In addition to using related market risk factors to reflect underlying return/risk relationships one may also simply attempt to use the actual securities used in a particular strategy to replicate that trading process. For example, for equity long/short one can use common securities (e.g. long value/short growth) used in trading the hedge fund strategy to replicate that strategy over time. The trading replication strategy shown in **Exhibit 5** is entirely passive and thus incorporates no specific manager skill. The correlation between the two approaches (active and passive) is high (almost 60%) but, as expected, the approach which incorporates active management outperforms on a risk adjusted basis that which is constructed from a strictly passive approach (based strictly on past data).

Risk/Return Opportunities in Periods of Extreme Market Performance

It is important to point out that multiple regression and correlation generally reflect relationships over a particular cross sectional period. One should not expect a perfect relationship between a hedge fund strategy return and underlying market factors since the relationship between strategy return and market factors is period and strategy specific. In fact, research (Schneeweis et. al., 2003) has shown that the expected relationship between hedge fund strategy returns and market returns is most evident in periods of extreme market movements of the underlying market factors.

Exhibit 5: Active and Passive Equity Long Short Performance



The correlations between various hedge fund strategies and the S&P 500 for the period 1990-2004 are presented in **Exhibit 6**. However, when the strategy returns are segmented according to whether the S&P 500 increased or decreased in value, the correlation of various hedge fund

strategies with traditional asset markets may change. For instance, as shown in **Exhibit 6** for the period January 1990 through December 2004, when strategy returns are ranked based on the S&P 500, certain hedge fund strategies (e.g., equity hedge or equity long/short) have higher correlation with the S&P 500 in the 48 worst performing S&P 500 months than with the S&P 500 in the 48 best performing S&P 500 months.

Exhibit 6: Market Sensitivity in Periods of Extreme Market Performance

Correlations in Best and Worst Forty-Eight S&P 500 Ranked Months (1990-2004)			
	All S&P 500 Months	Worst S&P 500 Worst Forty-Eight Months	Best S&P 500 Best Forty-Eight Months
Hedge Fund Composite	0.59	0.57	-0.04
Event Driven	0.59	0.69	-0.18
Equity Hedge	0.64	0.53	0.00
Equity Market Neutral	0.09	0.00	0.12
Merger/Risk Arbitrage	0.48	0.54	-0.09
Distressed	0.42	0.61	-0.20
Fixed Income Arbitrage	0.06	0.45	-0.22
Convertible Arbitrage	0.19	0.42	-0.02
Global Macro	0.26	0.07	0.04
Short Selling	-0.78	-0.59	-0.40

The Benefits of Determining Hedge Fund Strategy Market Factor Sensitivity

The benefits of determining a hedge fund strategy's sensitivity to market factors are varied. It is important to point out that unless the factor sensitivities of a strategy and/or portfolio are well known and constant over time the diversification benefits or asset replacement benefits cannot be determined. In brief, one should ensure that the hedge fund strategy or manager is consistent over time; that is, trading in similar securities with exposure to similar market risk exposures. Unfortunately, research (CISDM, 2003) has shown that simple use of 'manager' reported style classifications in large databases may not be sufficient in determining a strategy's exposure to

market factors. However, once managers/funds are segmented into ‘strategy consistent’ groupings, their relative co-movements increase dramatically in that managers will reflect a greater common sensitivity to central market factors. One cannot detail all the benefits of determining a hedge fund strategy’s sensitivity to various market factors but they include:

1. Knowledge of the risks, returns and other characteristics of a particular hedge fund trading strategy;
2. Aggregation and portability of knowledge of risks, returns and other characteristics across a collection of individual hedge funds and fund managers;
3. Establishment of a peer group and a benchmark for performance evaluation of individual managers and/or a portfolio of managers; and,
4. Strategic asset allocation to hedge funds along with traditional portfolio holdings.

Fund Based Attributes in Understanding Hedge Fund Return

Sensitivity to various market factors is not the only common source of hedge fund returns. In this brief review one cannot summarize all the research relating to how firm/fund attributes affect hedge fund returns. The following is a brief synopsis of a series of fund/firm based issues important in determining fund performance, including 1) Performance fees/lockup, 2) Fund Size, 3) Fund Age, 4) Leverage, and 5) Performance Persistence.

1) Performance Fees/Lockup: Research has indicated that there is little evidence of an impact of performance fees on overall performance and some evidence of a small effect of lockup on overall performance (Schneeweis et. al., 2002). This is as expected. Managers with excess gross

fees will often charge performance fees consistent with the excess returns such that on a net basis there is little relationship between fees and net performance. In contrast to performance fees, there is some evidence of an impact of lockup on performance. Investors must realize that this lockup is not evidence of excess return; that is, the longer lockups are often associated with less liquid positions in underlying securities.

2) Fund Size: Research (CISDM, 2003) has also shown some evidence that large funds may not outperform small funds on an absolute basis but that large funds do seem to outperform small funds on a risk adjusted basis. These results are consistent with previous research which hypothesizes that small funds may take riskier positions for a wide range of agency issues.

3) Fund Age: Some research has concluded that young funds outperform old funds on a total return basis or at least old funds do not outperform young funds. Research (CISDM, 2003) has shown that the outperformance of young funds may reflect backfill bias in databases and that after two years there is little evidence of differential performance.

4) Leverage: While greater leverage is often directly associated with greater risk and expected return, research has shown little direct relationship. In brief, while leverage and risk are directly associated, research (Schneeweis et.al. 2005) has indicated that for higher risk strategies managers use correspondingly lower leverage such that there is little direct relationship between absolute risk and leverage.

5) Performance Persistence: Some research (CISDM, 2003) has concluded that little performance persistence exists at the fund of funds level but that performance persistence does exist at the strategy level, in that strategies which perform well in one market environment will perform well in other similar market environments.

Summary

While hedge funds require active manager trading, it is important to realize that the underlying returns of each strategy are, at the most basic level, a function of the securities held and the risks taken. Often these risks and their associated returns, can be expressed by a strategy's sensitivity to various market factors as well as the fund's underlying structure (e.g., performance fees, leverage...). An appreciation of the return sensitivity of various hedge fund strategies to market factors as well as the unique structural attributes of the fund will better enable investors or portfolio managers to create a hedge fund portfolio which meets their unique risk and return requirements.

Selected References

CISDM White Papers on Performance Persistence, Leverage, Size, Fund Age. CISDM, 2003 - Web site: www.cisd.org.

Fung, W. and D.A. Hsieh, "Asset-Based Style Factors for Hedge Funds," *Financial Analysts Journal*, (September/October, 2002).

Schneeweis, Thomas, Hossein Kazemi, and George Martin, "Understanding Hedge Fund Performance: Research Issues Revisited: Part I," *Journal of Alternative Investments* (Winter 2002).

Schneeweis, Thomas, Hossein Kazemi, and George Martin, "Understanding Hedge Fund Performance: Research Issues Revisited: Part II," *Journal of Alternative Investments* (Spring, 2003).

Schneeweis, Thomas., George. Martin, Hossein. Kazemi, Vassilis. Karavas, "The impact of Leverage on Hedge Fund Risk and Return", *Journal of Alternative Investments*, Spring 2005.